REMARKS

Regarding the Prosecution History:

Applicants are thankful for the Examiner's efforts to advance this application to allowance and are pleased to have this opportunity to address the Examiner's concerns. Upon careful review of the remarks presented in this reply, the Examiner will agree that the claimed invention is patentable and that this application is in good condition for allowance.

In the non-final Office Action of January 09, 2007, the Examiner objected to claim 7. In this reply, applicants have taken the Examiner's suggestion to amend the claim so that it depends from claim 3 rather than from "claims 3." The Examiner also objected to claim 14 – 16 and 18. In this reply applicants have amended the claims to depend from claim 13 rather than from claim 3.

In the non-final Office Action of January 09, 2007, the Examiner rejected:

I. claim 19 under 35 U.S.C. §112, second paragraph;
II. claims 1 – 13 and 19 – 22 under 35 U.S.C. §102(b) over *Gravley* (US 4,765,964);
III. claim 23 under 35 U.S.C §103(a) over *Gravley* (US 4,765,964) or over *Gravley* in view of *Kuehner* (US 5,188,806);
IV. claims 14 – 18 and 24 under 35 U.S.C §103(a) over *Gravley* in view of *Bakker* (US 3,640,739); and
V. claims 3, 13 – 19 and 24 on the grounds of nonstatutory obviousness-type double patenting over claims 1 – 7 of US 6,869,279.

Regarding the Claim Amendments presented in this reply:

The amendments to the claims add no new matter. Claim 19 has been canceled. The other amendments merely correct typographical errors.

Regarding Rejection I:

The Examiner should withdraw the rejection of claim 19 under 35 U.S.C. §112, second paragraph. This rejection is moot in light of the cancellation of claim 19.

Regarding Rejection II:

The Examiner should withdraw the rejection of claims 1 – 13 and 19 – 22 under 35 U.S.C. §102(b) over *Gravley* (US 4,765,964).

Please note: Claim 2 depends from claim 1. Claims 4 – 13 and 20 – 22 depend from claim 3. Claim 19 is canceled. The following discussion focuses on independent claims 1 and 3.

Anticipation can only be established by a single prior art reference which discloses each and every element of the claimed invention.[1] "The identical invention must be shown in as complete detail as is contained in the patent claim."[2]

Claim 1 is directed to a process for the scale-up of a reactor. This process is characterized in that for a throughput enlargement the internal diameter of the reactor is enlarged. Among other requirements, the reactor must provide a supply of a reaction mixture via channels of a burner block to a reaction chamber.

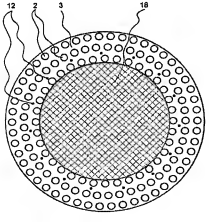
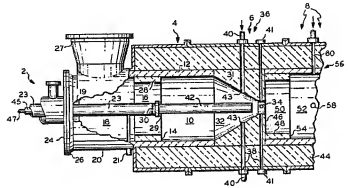


Figure 3 is reproduced to the right, for the Examiner's convenience. This figure shows a top view of a burner block according to the present invention. The channels **2** of the burner block **3** supply a reaction mixture to the reaction chamber.

The identical process for the scale-up of a reactor, as claimed in claim 1, is not

[1] *See, RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444 (Fed. Cir. 1984).
[2] *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

disclosed in the *Gravley* reference. Likewise, the identical reactor, as claimed in claim 3, is not disclosed in the *Gravley* reference. According to the reference, "a tubular member **23** extends through the chamber **18** and empties into the passage **16**."[3] "Oxidant fluid and combustible fluid are introduced into a chamber **10** via the passage **16**."[4]



Thus, according to the *Gravley* reference, the reactor does not provide a supply of a reaction mixture via channels of a burner block to a reaction chamber. To the contrary, the *Gravley* reference describes supplying a reaction mixture to a reaction chamber via a passage **16**. Passage **16** of the *Gravley* reference bears no resemblance to channels of a burner block, according to the present invention.

According to claim 1 of the present invention, the transition from the reaction chamber to the quench area must be designed in the form of a gap which is restricted to a width in the range from 2 to 200 mm. Claim 3 requires that the transition of the reaction chamber to the quench area is designed in the form of an annular gap.

The reference does not describe such a transition from a reaction chamber to a quench area. Instead of a *gap*, the reference describes a mere *throat*. More specifically, the reference explains that:

> The mixing zone **6** comprises a sidewall **31** formed from refractory defining a chamber **32** in axial alignment with and converging from the combustion chamber **10** to a throat **34** and a means **36** for introducing a carbonaceous feedstock through the sidewall **31** and into at least one of the converging chamber **32** and the throat **34**.

[3] Column 3, lines 22 – 24 of US 4,765,964.
[4] Column 3, lines 15 – 16 of US 4,765,964.

The throat according to the *Gravley* reference bears no resemblance to the gap according to the present invention. It may be easier to appreciate the difference between the *Gravley* throat and the gap, according to the present invention, by looking to the preferred embodiments of the gap. The specification explains, for example, that the gap can be designed as an annular gap. Such an annular gap is illustrated in Figures 2 and 4, which are reproduced below for the Examiner's convenience.

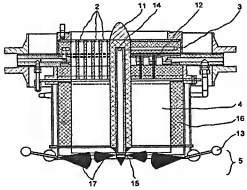


Figure 2.

Portion of Figure 4.

Figure 2 illustrates a section of a reactor, consisting of a burner block **3**, a reaction chamber **4** and a quench area **5**. Please notice the internal quench nozzles **15**, which are supplied via line **14**, and the spray jets **17**, which are directed into the annular gap.

The portion of Figure 4 reproduced above shows a quench medium sprayed clockwise in a tangential direction into the quench area designed as an annular gap using annularly arranged quench nozzles.

The Examiner will, of course, appreciate that the gap according to claim 1 (unlike the gap according to claim 3), need not be an annular gap. The above discussion of Figures 2 and 4 is intended to facilitate an appreciation of the difference between a gap according to the present invention and a throat as described by the *Gravley* reference, not to further limit the gap as defined in any of the claims.

The present specification makes clear that the specific reactor geometry defined in claim 1 makes it possible to scale up the reactor without losses in yield. Enlargement of the reactor is problematical, since with increasing diameter of the cylindrical reaction

chamber and of the cylindrical quench area the homogeneity of the quench action is more and more difficult to guarantee. This is because the penetration depth of the spray jets and the droplet size in the atomization are directly connected. This means that the small droplets necessary for rapid evaporation and thus a good quench action only achieve limited penetration depths, since the small droplets are prematurely deflected on account of the low impetus. Inhomogeneities in the quench action thereby occur, which favor the breakdown of the acetylene in the hotter streams.

It was the object of the invention to find a burner geometry which on scale enlargement causes no yield losses in order thereby with fewer production streams to manage with in each case larger units or in the case of existing larger units having a prespecified scale to achieve a yield and thus capacity increase.

Using the solution according to the invention presented here, the disadvantages of the enlargement of the cylindrical cross section with respect to the realizable quench action are avoided by changing from the cylindrical geometry (like the throat **34** described in the *Gravley* reference) to a gap-like geometry. The gap is designed here such that heat dissipation is possible very effectively and homogeneously by direct spraying in of water from one or from both sides of the gap with small jet reaches and very fine sprays.

In light of the discussion above, the Examiner will agree that the *Gravley* reference fails to anticipate the claimed invention.

No apparent reason existed to modify the *Gravley* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. No apparent reason existed to modify the *Gravley* reference so that the transition from the reaction chamber to the quench area is designed in the form of a gap, let alone a gap which is restricted to a width in the range from 2 to 200 mm. Thus, the present invention is non-obvious over the *Gravley* reference.

Regarding Rejection III:

The Examiner should withdraw the rejection of claim 23 under 35 U.S.C §103(a) over *Gravley* (US 4,765,964) or over *Gravley* in view of *Kuehner* (US 5,188,806).

The Examiner admits that "*Gravley* does not disclose direct quenching brought about by single or multistage mixing of a cooling medium into the reaction mixture via one or more annular distributors."[5] However, the Examiner argues that "direct quenching via annular distributors is known in the art."[6]

The *Kuehner* reference provides no apparent reason to modify the *Gravley* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. The *Kuehner* reference provides no apparent reason to modify the *Gravley* reference so that the transition from the reaction chamber to the quench area is designed in the form of a gap, let alone an annular gap. Thus, the present invention is non-obvious over *Gravley* in view of *Kuehner*.

Regarding Rejection IV:

The Examiner should withdraw the rejection of claims 14 – 18 and 24 under 35 U.S.C §103(a) over *Gravley* in view of *Bakker* (US 3,640,739)

The Examiner argues that it would have been obvious "to incorporate the refractory of *Bakker* into the reactor of *Gravley* so as to provide for a more durable refractory sufficient for use under high reaction temperatures."[7]

The *Bakker* reference provides no apparent reason to modify the *Gravley* reference so that the reactor provides a supply of a reaction mixture via channels of a burner block to a reaction chamber. The *Bakker* reference provides no apparent reason to modify the *Gravley* reference so that the transition from the reaction chamber to the quench area is designed in the form of a gap, let alone an annular gap. Thus, the present invention is non-obvious over *Gravley* in view of *Bakker*.

Regarding Rejection V:

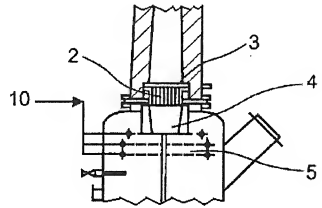
The Examiner should withdraw the rejection of claims 3, 13 – 19 and 24 on the grounds of nonstatutory obviousness-type double patenting over claims 1 – 7 of US

[5] Page 7, lines 15 – 17 of the Office action mailed January 09, 2007.
[6] Page 7, lines 18 of the Office action mailed January 09, 2007.
[7] Page 8, lines 18 – 20 of the Office action mailed January 09, 2007.

6,869,279.

The Examiner asserts that the only difference between these claims is that US 6,869,279 fails to specifically recite "a reactor 'characterized in that the transition of the reaction chamber to quench area is designed in the form of an annular gap.'"[8] The Examiner argues that such an annular gap is "necessarily present in the reactor of the '279 patent, since there must be some separation of space (i.e. a 'gap') between the reaction zone and quench zone."[9] It is clear from the Examiner's argument that at the time the present Office action was written, the Examiner misunderstood the present invention. A transition of the reaction chamber to the quench area designed in the form of an annular gap, is not described in US 6,869,279.

Figure 2 of US 6,869,279, is partially reproduced to the right, for the Examiner's convenience. This Figure provides the only illustration of the transition between a reaction chamber **4** and a quench area **5** according to the claims of the reference. It should be clear that the transition of the reaction chamber to the quench area is not designed in the form of an annular gap. To the contrary, according to the reference, reaction chamber **4** empties into quench area **5** through an apparently cylindrical cross-section.



The reference does not contemplate a transition of the reaction chamber to the quench area designed in the form of an annular gap. Since, the reference provides no apparent reason to make the modifications necessary to arrive at the present invention, the claims 3, 13 – 19 and 24 of the present inveiont are non-obvious over claims 1 – 7 of the reference. The present rejection is in error and should be withdrawn. Favorable action is respectfully solicited.

[8] Page 10, lines 12 – 13 of the Office action mailed January 09, 2007.
[9] Page 10, lines 15 – 16 of the Office action mailed January 09, 2007.

In Conclusion:

The present application is in condition for allowance. Again, applicants are thankful for the Examiner's diligent efforts to advance this application to allowance, and request favorable action in this matter. In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner is welcome to contact the undersigned by phone to further the discussion.

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Respectfully submitted,
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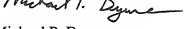

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